

THERMAL INTERFACE MATERIAL
AND SOLDER PREFORMS

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application is a continuation-in-part application of
U.S. Application No. 10/151,741, filed May 20, 2002, ^{Pat. 6,653,741} and
further claims the benefit of U.S. Provisional Application No.
60/293,457, filed May 24, 2001, and U.S. Provisional
Application No. 60/306,218, filed July 18, 2001.

BACKGROUND OF THE INVENTION

10 Thermal interface materials (TIMs) are critical to
protect active semiconductor devices, such as microprocessors,
from exceeding the operational temperature limit. They enable
thermal bonding of the heat generating device (e.g., a silicon
semiconductor) to a heat sink or a heat spreader (e.g, copper
15 and/or aluminum components) without presenting an excessive
thermal barrier. Different TIMs may also be used in the
assembly of other components of the heat sink or the heat
spreader stack that comprise the overall thermal impedance
path.

20 Formation of a small thermal barrier is an important
property of a TIM. The thermal barrier can be described in
terms of effective thermal conductivity through the TIM and is
preferably as high as possible. The effective thermal
conductivity of the TIM is primarily due to the interfacial
25 heat transfer coefficient as well as the (intrinsic) bulk
thermal conductivity of the TIM. A variety of other
properties are also important for a TIM depending on the
particular application, for example: an ability to